

REMARKS

Claims 1, 17 to 23 and 26 to 30 are all the claims pending in the application, prior to the present Amendment.

Claims 1, 17-23, 26-27, and 29-30 have been indicated by the Examiner to be allowable if applicants are able to overcome the rejections under 35 U.S.C. § 112, 1st and 2nd paragraph, set forth in the present Office Action and discussed in further detail below.

Claims 1, 17-23, 26-27, and 29-30 have been rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Also, claims 1, 17-23, 26-27, and 29-30 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

The basis for both of the §112 rejections is the same. That is, the Examiner believes that there is no support for the recited diameter range of 100-300 nm.

In response, applicants submit that the present application clearly supports such a range since Example 1 at page 24, line 25 discloses a diameter of 100 nm, and the specification describes a range of 10-300 nm at page 12. See, *In re Wertheim*, 191 USPQ 90, 98 (CCPA 1976). Since applicants believe the present claims to be patentable with a recitation of the broader range, applicants have amended the claims to recite a fiber filament diameter of 10-300 nm. Support for this range can be found in the original specification where a range of “10 to 300 nm” for the filament diameter is described at, for example, the second and third full

paragraphs on page 12. Applicants request withdrawal of these rejections in view of this amendment.

Based on the Examiner's statement of reasons for allowance, it appears that the Examiner has been persuaded of the patentability of the pending claims without reliance on the recited diameter range of 100-300 nm. Accordingly, applicants have amended claims 1, 17, 21-22, and 29 to replace the range of 100-300 nm with the range of 10-300 nm.

Applicants have also amended the independent claims to recite subject matter from claim 23 that the fibrous carbon has been formed through heat treatment at a temperature of at least 2000°C and subject matter from claim 26 that the fibrous carbon has a fiber filament length of 100 μm or less. Claims 23 and 26 have been canceled. In addition, applicants have amended the claims to remove references to a graphitized vapor grown carbon fiber containing boron.

Thus, for example, as amended above, claim 1 is directed to a fuel cell comprising an electrolyte sandwiched by electrodes having a catalyst layer and a gas diffusion layer, or an assembly for a fuel cell comprising an electrolyte sandwiched by electrodes having a catalyst layer and a gas diffusion layer, characterized in that the gas diffusion layer comprises a layer containing a water repellant resin and a fibrous carbon formed through heat treatment at a temperature of at least 2000°C, wherein the fibrous carbon has a fiber filament length of 100 μm or less and a fiber filament diameter of 10-300 nm, wherein at least part of the surface of the gas diffusion layer is in contact with the catalyst layer.

Applicants note that the above amended claims are broader in scope than the scope of claims which the Examiner indicated allowable. Applicants submit that these broader claims are

allowable over the EP '683, JP '571 and Nishimura et al references that the Examiner referred to in his statement of reasons for allowance.

EP '683 and JP '571 disclose fuel cells, but do not disclose the fibrous carbon employed in the present invention. The Examiner has relied on Nishimura et al for a disclosure of the fibrous carbon.

Carbon materials have been used for improving the gas permeability and conductivity of a gas diffusion layer.

In order to improve the gas permeability, water produced should be effectively discharged from the gas diffusion layer and the material of the gas diffusion layer therefore should be hydrophobic, which is attained by a carbon material.

In the present invention, the crystallinity of the carbon material has been improved in comparison with the conventional carbon materials to thereby improve the water repellant property.

When a space for efficiently discharging water produced is considered, it was discovered that voids having a size of 0.1-50 μm should increase and occupy 40% or more of the total void volume of surface layer of the gas diffusion layer. The present inventor discovered a carbon fiber which attains the above void size.

Nishimura et al disclose a fibrous carbon as an anode additive to a lithium ion secondary battery (LIB).

As stated in the Amendment Under 37 C.F.R. § 114(c) filed on September 25, 2006, although Nishimura et al may disclose a carbon fiber in connection with a lithium battery

electrode or a field-emission display (FED), or as an addition to a resin, Nishimura et al do not disclose a carbon fiber in a fuel cell or an assembly for a fuel cell, as in the present case.

Thus, Nishimura et al relate to an invention mainly used for a lithium battery, and a description regarding a fuel cell is not present in Nishimura et al. See, for example, column 1, lines 16 to 27, column 11, lines 28 to 33 and Example 7 of Nishimura et al. Accordingly, applicants submit that one of ordinary skill in the art cannot arrive at the subject matter of the present claims, even if the teachings of Nishimura et al are combined with the teachings of EP '638 and JP '571, because there is no teaching in any of the references to employ the carbon fiber recited in the present claims in a fuel cell or in an assembly for a fuel cell.

Further, the problems and technical idea are essentially different between the fuel cells of EP '683 and JP '571 and the lithium ion secondary battery of Nishimura et al. Therefore, Nishimura et al do not suggest using the fibrous carbon of the present claims in a gas diffusion layer of a fuel cell.

Applicants submit that there is no motivation to combine the teachings of EP '683 and JP '571 with the teachings of Nishimura et al. Thus, it is difficult for a person of ordinary skill in the art to combine EP '638 with JP '571 and Nishimura et al to derive the fuel cells and assemblies as claimed in Claims 1, 17, 21, 22 and 29.

In view of the above, applicants submit that the subject matter of the present claims is not obvious from EP '683, JP '571 and Nishimura et al.

AMENDMENT UNDER 37 C.F.R. 1.111
Application No. 10/049,188

Attorney Docket No. Q63028

Claim 28 is drawn to a process for producing a layer assembly for a fuel cell. It is presently withdrawn for being directed to non-elected subject matter.

Applicants request rejoinder of claim 28 in view of the above amendments to claim 28 in which applicants have amended claim 28 to include recitations of product claim 1, which claim applicants believe to be allowable.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

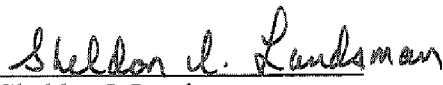
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